

# **Machine Learning with Python Programming- syllabus**

## **Python Programming (Part-1)**

### **Introduction to Python Programming**

What is Python Programming?

History of Python Programming

Features of Python Programming

Why to learn Python Programming

Application of Python Programming

### **Setup of Python Programming**

Getting Python

Installation of Python

Getting started with the first Python program

Running the first Python Program

### **Variables and Data types**

What is a variable?

Declaration of variable

Variable assignment

Data types in Python

Checking Data type

Data types Conversion

Python programs for Variables and Data types.

### **Python Identifiers, Keywords, Reading Input, Output Formatting**

What is an Identifier?

Keywords

Reading Input

Taking multiple inputs from user

Output Formatting

Python end parameter

## Operators in Python

Operators and types of operators

1. Arithmetic Operators

2. Relational Operators

3. Assignment Operators

4. Logical Operators

5. Membership Operators

6. Identity Operators

7. Bitwise Operators

Python programs for all types of operators

## DECISION MAKING

Introduction to Decision making

Types of decision making statements

Introduction, syntax, flowchart and programs for

- if statement

- if...else statement

- elif statement

## Loops

Introduction to loops

Types of loops

- for loop

- while loop

- infinite loop

- nested loop

Break, continue and pass statement

Python programs for all types of loops

## NUMBERS

Number Type Conversion

Random Number Functions

Trigonometric Functions

Mathematical Constants

## STRINGS

Accessing Values in Strings

Updating Strings

String Special Operators

Built-in String Methods

## LISTS

Python Lists

Accessing Values in Lists

Updating Lists

Deleting List Elements

Basic List Operations

Built-in List Functions and Methods

## TUPLES

Accessing Values in Tuples

Updating Tuples

Deleting Tuple Elements

Basic Tuples Operations

Built-in Tuple Functions

Difference between list and tuple

## DICTIONARY

Accessing Values in Dictionary

Updating Dictionary

Delete Dictionary Elements

Properties of Dictionary Keys

Built-in Dictionary Functions and Methods

## FUNCTIONS

Defining a Function

Calling a Function

Passing by Reference versus Passing by Value

Ways to write function

Types of functions

Anonymous function

Recursive Function

## MODULES

What is a module?

Creating a module

The import Statement

The **'from'** import Statement

Renaming a module

Using the dir() function

The **'from'** import \* Statement

Locating Modules

## FILES I/O

Printing to the Screen

Opening and Closing Files

The open Function

The file Object Attributes

The close() Method

Reading and Writing Files

The write() Method

The read() Method

MORE OPERATIONS ON FILES

## REGULAR EXPRESSION

What is a REGULAR EXPRESSION?

Metacharacters

match() function

search() function

re.match() vs re.search()

findall() function

split() function

sub() function

## Machine Learning (Part-2)

### Introduction to Machine Learning

What is a Machine Learning?

Need for Machine Learning

Why & When to Make Machines Learn?

Challenges in Machines Learning

Application of Machine Learning

### Types of Machine Learning

## Types of Machine Learning

- Supervised learning
- Unsupervised learning
- Reinforcement learning

## Difference between Supervised and Unsupervised learning

- Summary

## Components of Python ML Ecosystem

Using Pre-packaged Python Distribution: Anaconda

Jupyter Notebook

NumPy

Pandas

Scikit-learn

## Regression Analysis (Part-I)

Regression Analysis

Linear Regression

Examples on Linear Regression

scikit-learn library to implement simple linear regression

## Regression Analysis (Part-II)

Multiple Linear Regression

Examples on Multiple Linear Regression

Polynomial Regression

Examples on Polynomial Regression

## Classification (Part-I)

What is Classification

Classification Terminologies in Machine Learning

Types of Learner in Classification

Logistic Regression

Example on Logistic Regression

## Classification (Part-II)

What is KNN?

How does the KNN algorithm work?

How do you decide the number of neighbors in KNN?

Implementation of KNN classifier

What is a Decision Tree?

Implementation of Decision Tree

SVM and its implementation

## Clustering (Part-I)

What is Clustering?

Applications of Clustering

Clustering Algorithms

K-Means Clustering

How does K-Means Clustering work?

K-Means Clustering algorithm example

## Clustering (Part-II)

Hierarchical Clustering

Agglomerative Hierarchical clustering and how does it work

Working of Dendrogram in Hierarchical clustering

Implementation of Agglomerative Hierarchical Clustering

## Association Rule Learning

Association Rule Learning

Apriori algorithm

Working of Apriori algorithm

Implementation of Apriori algorithm

## **Recommender Systems**

Introduction to Recommender Systems

Content-based Filtering

How Content-based Filtering work

Collaborative Filtering

Implementation of Movie Recommender System